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HORTICULTURE NEW ZEALAND

USING COVER CROPS TO INCREASE YIELD

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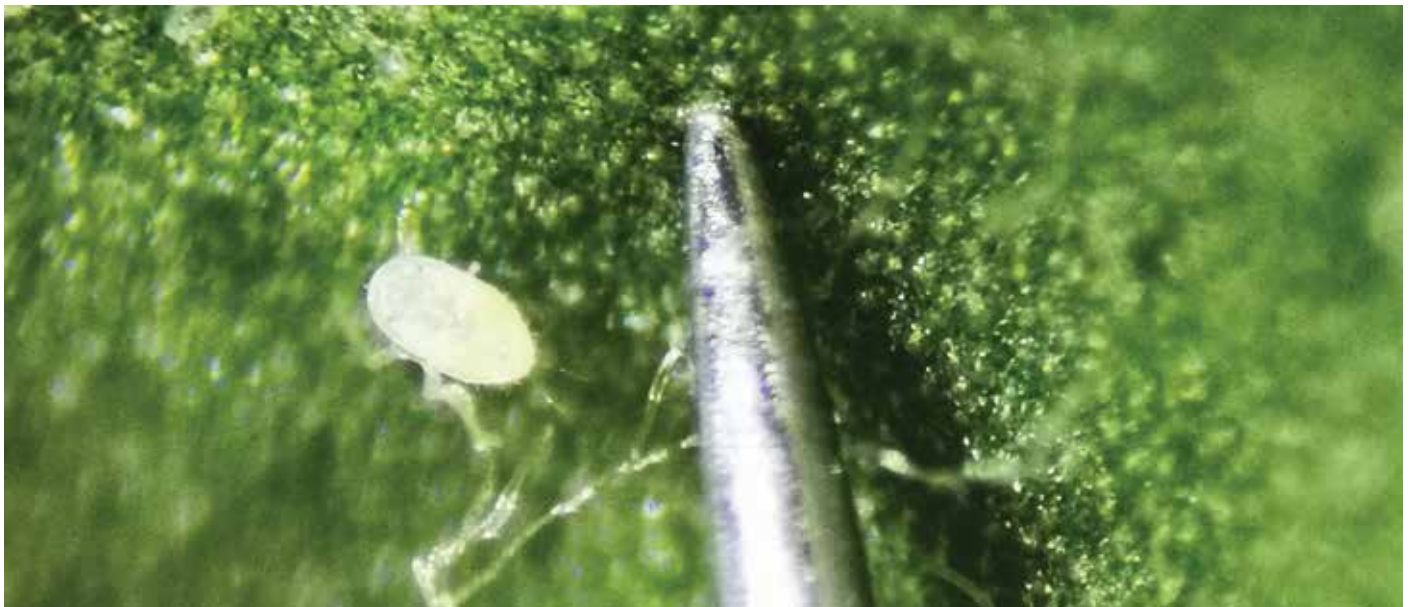
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NATIVE PREDATORS BEING TRIALLED IN GREENHOUSE TOMATOES

Supplied

Photos: Chris Thompson, Bioforce



A whitefly larva next to an acupuncture needle

The potential for native bugs to help control two major greenhouse insect pests is an exciting development in pest control for tomato growers.

A Tomatoes New Zealand project in conjunction with 'A Lighter Touch' is aiming to change the face of crop management of greenhouse tomatoes, moving the industry back to an Integrated Pest Management (IPM) system centred on biological control of insect pests, rather than chemical control.

TomatoesNZ technical lead Lex Dillon says all glasshouse growers, including other greenhouse crops such as capsicum and cucumber producers, have traditionally been big users of biotechnology.

"Tomato growers have been using bumblebees since the early 1990s to pollinate their crops, and they've been using a parasitic wasp *Encarsia formosa* as their main pest control beneficial insect. There's a long history of using biological control systems."

That all changed in the summer of 2005-6 with the arrival of the Tomato potato psyllid (TPP), an overseas pest for which no biological controls were available in New Zealand. The absence of biocontrol tools for this psyllid prompted many tomato growers to move away from biocontrol to more conventional chemical control. Reintroduction of agrichemical sprays in greenhouses in turn disrupted the performance of what had been successful biocontrol of Greenhouse whitefly using the parasitic wasps.

Some growers persevered with biological controls, but these efforts were further compromised by overseas market conditions requiring that crops with a certain amount of psyllids be sprayed.

"From being an industry that was largely using biologicals, many New Zealand growers went back to conventional controls, using agrichemicals."

However, growing pest resistance to agrichemicals had been the driving force behind the growth of biocontrols

in the greenhouse industry internationally, so without effective biocontrols New Zealand growers were also faced with a declining number of new chemical options for pest control, Lex says.

Overseas biocontrol agents were considered for use in New Zealand greenhouses, but proved not to be feasible.

“For the industry to get back on top, the decision was made to investigate what native and/or endemic species were available that could be used as biological controls in greenhouses,” he says.

Enter the TomatoesNZ ‘A Lighter Touch’ project, the primary role of which has been to identify both native beneficials and introduced bugs already present in New Zealand that can be used to control both the Tomato potato psyllid and Greenhouse whitefly, the two major economic insect pests for greenhouse growers.

The project, now in the second year of a four-year programme, involves trials across seven sites, from Auckland to Otago. They range from large commercial operations of ten hectares or more to family businesses which are smaller in scale.

Four beneficial arthropods, or bugs, are being trialled, as a mix of beneficials is required for effective biocontrol.

“With biocontrols, it isn’t about one silver bullet. You use a mix of biologicals, with different biologicals controlling different stages of the life cycle of the pests, so we are looking to come up with a package of biological controls that will help growers manage glasshouse pests.”

Lex says another point of difference with biocontrol is that unlike chemical control, it’s not about wiping out the pest. “To have a population of biologicals, you need a population of pests for them to predate upon, otherwise the biologicals have no food source. It’s all about balance, and managing the pest populations so it doesn’t impact on fruit quality and profitability for the grower.”

There is also a range of ‘soft’ sprays that can be used in conjunction with biologicals. “The ultimate goal of the project is to add a range of biologicals that can be used in conjunction with soft sprays so that growers can have an integrated range of pest control options. A true IPM programme,” he says.

That difference in pest management could be a challenge for growers to come to terms with, but with agrichemical resistance building up, even chemical control is no longer able to eradicate all pests the way they once did, Lex says.

Project technical advisor Chris Thompson, of Bioforce, says earlier research had identified some native arthropods as potential predators of Greenhouse whitefly and Tomato potato psyllid. The field trials now underway were about testing their effectiveness in a commercial greenhouse environment to support observations from the lab plus outdoor trials.



Jackie Bong from NZ Hothouse releasing the predators on to tomato plants

One early observation has seen one of the native bugs released into an established psyllid population in a glasshouse and “rapidly decimate the population of juvenile pests found under the leaves,” Chris says.

“This demonstrates that, as was seen in the lab testing, this particular bug can potentially find and predate on juvenile psyllid stages. Of course, the project is still in its early phase, but this observation is a big step in the right direction.

“More research would also be needed to determine how many of the beneficials are required for optimal results, as well as the best time to introduce them in the life cycle of the pest.”

If further trials prove these native bugs are an effective predator to whitefly and psyllid, the project also includes plans for growers and bug suppliers to work together on how to establish an economically viable supply of the bugs for growers.



Vermiculite containing the predators on a tomato plant leaf

'A Lighter Touch' agroecological technical lead Jeff Smith says the project is a flagship piece of work for the programme.

"It's the major biological control agent project for the entire programme, and BCAs are going to play a key role in helping move plant food production from reliance on agrichemical control to crop protection with a lighter environmental touch."

Jeff says the idea of using native bugs to control insect pests is novel and generating great interest from growers across the horticulture sector. The concept is one that has the potential to be replicated across other product groups, so results from the project are keenly awaited. ●



If you are interested in knowing more about these projects and others like them, subscribe to the 'A Lighter Touch' newsletter "In Touch" at www.a-lighter-touch.co.nz.

ABOUT 'A LIGHTER TOUCH'

The 'A Lighter Touch' programme is an industry and government partnership supporting New Zealand growers to move to producing plant-based foods with a lighter environmental touch.

Funded by the Ministry for Primary Industries, and a partnership of 15 plant product groups and two crop protection companies, the \$27 million seven-year programme started in 2020. Its goal is to help plant food producers move from agrichemical crop protection to an agroecological approach – sustainable farming that works with nature.

A key point of difference about the programme is its collaborative nature, bringing together the horticulture, arable and wine sectors to share knowledge and funding. The long-term goal is to see New Zealand's plant-based food production move to a less chemical dependent future. Learn more about the programme and its projects at www.a-lighter-touch.co.nz